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A MULTI-ELECTRODE DISCHARGER, (U)

OCT 80 B M KOVAL'CHUK, G A MESYATS

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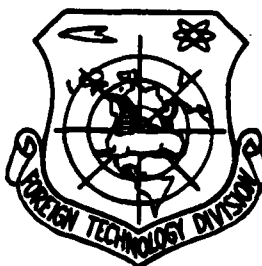
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A MULTI-ELECTRODE DISCHARGER

by

B. M. Koval'chuk, G. A. Mesyats, Yu. F. Potalitsyn



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# EDITED TRANSLATION

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6 A MULTI-ELECTRODE DISCHARGER

By 20 B. M./Koval'chuk, G. A./Mesyats  
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# U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З з	<i>З з</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, snch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	'
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

\*ye initially, after vowels, and after ъ, ы; e elsewhere.  
When written as ё in Russian, transliterate as yě or ě.

## RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh
cos	cos	ch	cosh	arc ch	cosh
tg	tan	th	tanh	arc th	tanh
ctg	cot	cth	coth	arc cth	coth
sec	sec	sch	sech	arc sch	sech
cosec	csc	csch	csch	arc csch	csch

Russian	English
rot	curl
lg	log

## A MULTI-ELECTRODE DISCHARGER

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The invention belongs to devices for the commutation of circuits in electrical systems where a high triggering precision of the switching element is required.

Multi-electrode dischargers with discharge gaps connected in series are well-known. The voltage in the gaps is distributed with the help of a resistance divider. The trigger capacitance is connected to one of the middle electrodes. However, the variation of triggering time of the known dischargers of this type is great and they are inconvenient when operating within a wide range of working voltages.

The proposed discharger is distinguished by the fact that for the purpose of raising the triggering stability and expanding the range of the working voltages the electrodes are made in the form of metal tubes arranged in parallel with cylindrical attachments in the central part, the space between which forms the discharge gaps. Insulated wires which create capacitive couplings with the electrodes pass through the inside of the tubes. The resistance divider is installed at the end of the tubes in an insulator sealed with an epoxy compound, for example.

For the purpose of reducing the variation of operating time the trigger capacitance is connected to one of the electrodes so that a large part of the discharge gap is located between the trigger capacitance and the power supply. An auxiliary spark discharger is installed near the gaps in order to illuminate the gaps with ultraviolet radiation which occurs during a breakdown of the discharger.

The discharger is presented in an axonometric projection in Fig. 1; Fig. 2 presents a circuit diagram; Fig. 3 - the equivalent circuitry.

The discharger contains parallel-arranged metal tubes (1) with cylindrical attachments (2) the space between which forms the discharge gaps. Insulated wires which create capacitive couplings to ground pass through the inside of the tubes. The resistance divider is installed at the end of the tubes in the insulator sealed with an epoxy compound (3) for example.

The trigger capacitance is connected to one of the electrodes so that a larger part of the discharge gaps is located between it and the power supply (see Fig. 2 and 3) while the auxiliary discharger (4) is installed near the electrodes (see Fig. 1) in order to illuminate the gaps with ultraviolet radiation which occurs during a breakdown of this discharger. A diagram of the connection of the auxiliary discharger is shown in Fig. 3.

The device operates in the following manner.

The trigger pulse causes a breakdown of the auxiliary discharger and goes to one of the discharge electrodes causing a breakdown of the nearest interelectrode gap. After the breakdown of one gap the trigger voltage is applied to the next gap and so on, until all gaps are broken down. Such a discharger operates with a large over-voltage on the electrodes at the moment of breakdown and has a wide range of working voltages.

One of the models of the discharger operated within the range of voltages from several hundred up to 50 kV, the triggering time's

variation did not exceed  $3 \cdot 10^{-9}$  seconds, and the amplitude of the commutated current reached 100 kA when the oscillation period was 20 s. Brass casings with a length of 280 mm and a diameter of 10 mm served as electrodes.

#### The object of the invention

1. The multi-electrode discharger containing a power supply, a load, electrodes with discharge gaps connected in series, a resistance divider for evenly distributing the voltage between the electrodes, capacitances connected to electrodes, and a trigger capacitance connected to one of the middle electrodes is distinguished by the fact that for the purpose of improving the triggering stability and expanding the range of working voltages the electrodes are made in the form of metal tubes arranged in parallel with cylindrical attachments in the central part, the space between which forms discharge gaps, insulated wires which create capacitive couplings with the electrodes go through the inside of the tubes, and a resistance divider is installed at the end of the tubes in the insulator sealed with an epoxy compound, for example.

2. The discharger according to paragraph 1 is distinguished by the fact that for the purpose of reducing the variation of the triggering time the trigger capacitance is connected to one of the electrodes so that a large part of the discharge gaps is found arranged between the trigger capacitance and the power supply and an auxiliary spark discharger for illuminating the gaps with ultraviolet radiation which occurs upon breakdown of this discharger is installed near the gaps.

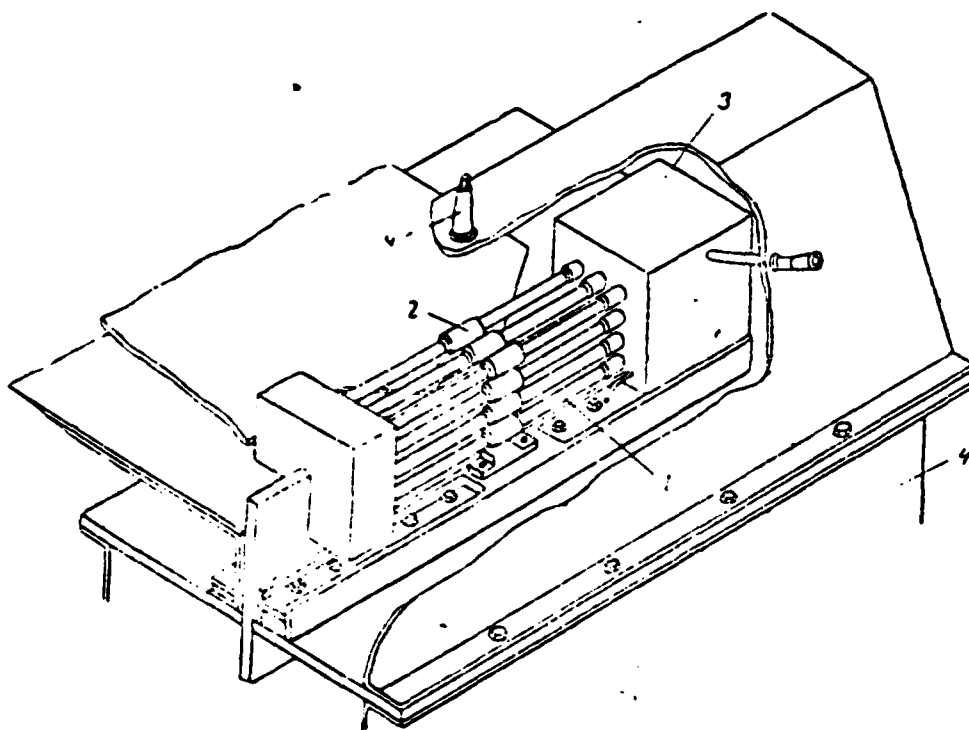


Fig. 1.

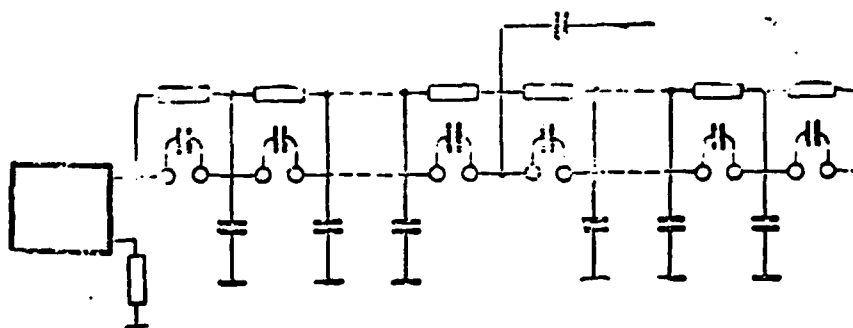


Fig. 2.



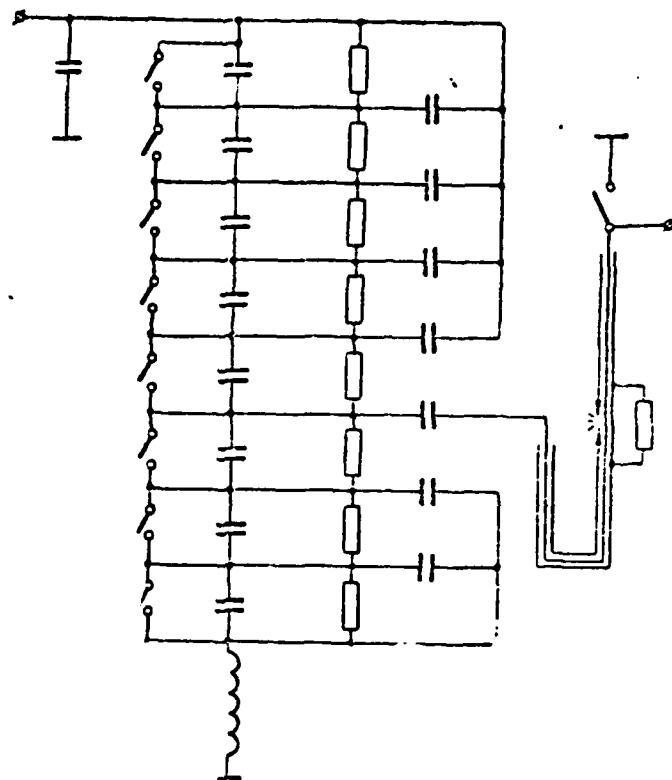


Fig. 3.